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I, LEANNE MYNOTT, MANAGER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003906833 for a patent by KEITH JOHNSON and TIMOTHY JOHNSON as filed on 09 December 2003.

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Fourteenth day of December 2004

LEANNE MYNOTT
MANAGER EXAMINATION SUPPORT
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AUSTRALIA

PATENTS ACT 1990

PROVISIONAL SPECIFICATION

FOR THE INVENTION ENTITLED:-

"METHOD OF CLEANING A HULL"

The invention is described in the following statement:-

FIELD OF THE INVENTION

The present invention relates to the cleaning marine growth off of ship and boat hulls or the like and also has extension to cleaning of other water immersed structures.

BACKGROUND OF THE INVENTION

The necessity for cleaning boat hulls or the like so as to remove marine life is well know. For example, it is thought that a clean boat hull is 10% – 30% more efficient than one which is fouled by marine life. This can have significant bearing on commercial shipping and is also relevant in recreational crafts such as boat racing or the like.

A number of techniques for hull cleaning are known. These include the utilisation of copper based toxins to repel algae growth. Such toxins are often banned in various countries due to unwanted side effects. Further, mechanical scrubbing techniques utilising brush cleaning machines or the like maybe be provided. However, again, authorities have often banned the use of such equipment due to the likelyhood of infestation of imported marine life in areas where the mechanical cleaning occurs.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide for an alternative method of cleaning marine growth off hulls.

In accordance with a further aspect of the present invention, there is provided a method of cleaning the marine growth off the hull of a water going object, the method including the step of heating the marine growth on the surface of the hull. The hull surface can be heated whilst submersed below a water line. The hull surface can be heated by means of an adjacent blanket placed near the hull. Heated water or steam can be projected between the blanket and the hull surface so as to heat the hull surface.

The blanket preferably can include an outer rim for engaging with the surface of the hull, substantially holding the heated water or steam between the blanket and hull surface.

In accordance with a further aspect of the present invention, there is provided an apparatus for reducing the effect of biological build-up on a hull, the apparatus comprising: heating means for heating the marine growth on the surface of the hull. The apparatus can be designed to heat the hull surface whilst submersed in water.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the preferred embodiments will now be described with reference to the accompanying drawings in which:

Fig. 1 illustrates a schematic perspective of the operation of the preferred embodiment;

Fig. 2 illustrates a side sectional view of the heat mat in further detail;

Fig. 3 illustrates a top plan view of the mat; and

Fig. 4 is a side plan view of the mat.

DESCRIPTION OF PREFERRED AND OTHER EMBODIMENTS

In the preferred embodiment, there is provided a method for attending to cleaning of a boat hull by means of applying an excessive temperature to the marine growth located on the hull surface. The excessive temperature is utilised to substantially kill the marine growth which it firmly adhered to the hull. It is found that, in practice, the marine growth can be killed in less than 24 hours after the heat treatment. The decayed killed growth ultimately breaks down and falls off the ship when it is underway.

The present invention has equal application to marine growth both above and below the water line. Where dry docking facilities are available, it can be carried out by

heating the marine growth on the hull surface. Where the ship is in the water, other techniques should be used.

The preferred embodiment can proceed by applying hot water or steam to a ships hull beneath a "mat" to create a heat controlled environment against the ships gull for a period long enough to kill any weed or barnacles but not necessarily to initiate their immediate falloff.

An example of a suitable arrangement is illustrated in Fig. 1 wherein a large ship hull 2 is shown under a waterline 3. A mat 4 is affixed adjacent the ship hull 2 and held in place either manually or automatically. A manual system can include a diver (not shown) whose job it is to hold the mat 4 against the surface of the hull 2 for an extended period of time. Hot water or steam is pumped down a first pipe 5 and flows along the surface of the hull and out of second series of pipes 6, 7. The out flow can be reheated.

Preferable, the system is tuned to the type of material on the hull by a trial and error process.

The process can be used on other underwater structures which attract unwanted marine growths. These can include oilrigs, wharfs and bridge pilings, etc. There are other ways that hot water or steam may be held against a ships hull below the waterline. These can include surrounding the entire vessel in a large cover or tarpaulin. However, this may require an excessive heat loss and energy levels required to maintain the high temperature. Small vessels may be treated in this way.

In the preferred embodiment, small areas of say one or two meters squared are treated individually by placing a static heat blanket against the hull. The heat blanket can include a magnetic braid or roller system at the perimeter. By simply circulating hot water into and out of the blanket as shown in Fig. 1, and reheating the return water the

water can be re-used and pumped back into the blanket. In one example embodiment, the system can be fully closed in that the hot water is recycled and reheated.

Alternatively, the system could also operate in an "open circuit" arrangement where the "cooled down" hot water is not recycled for reheat and reuse but is discarded into the surrounding area immediately around the perimeter of the "kill mat trolley". The hot water can be pumped into the kill mat trolley via a single hose allowing for some minor "positive" pressure of hot water within the 'kill mat trolley". The hot but cooling water can continuously escape via the (perimeter of the kill mat trolley) into the surrounding water body. The open circuit arrangement is likely to be less energy efficient but allows for better quality control characteristics in maintaining a suitable "kill temperature".

The above process can be extended to a movable process wherein the basic square frame is utilised with a neoprene cover or other insulating materials. Such an arrangement is illustrated in Fig. 2 – Fig. 4 wherein an outer neoprene sheet 10 is placed over an aluminium frame having one magnetic roller e.g. 11, 12 placed at each corner. The neoprene flat outer and inner covers around the four sides keep hot water in and reduce cold water entering from the outside. The four magnetic wheels e.g. 11-14 are preferably adjustable to allow for a variable gap of 5-25mm between the frame and the ships hull.

Initially, the arrangement can be manipulated by a diver. Preferable, effective heating rates are determined including variable dimension sizes for the mat 4. Also arrangements can be constructed so as to minimise the heat losses. Subsequently, the system can be automated for producing a diver free arrangement.

In practice, it has been found that results can be produced by heating the surface above particular temperature ranges. For example, it was found that heating temperatures just over 50 Degrees Celsius were not as effective as temperatures over 60 Degrees Celsius. Further, temperatures over 60 Degrees did not produce substantial differences from 60 Degrees. Further, it was found that application times could be very short. In some cases below 5 seconds, with results still being effective.

Further, in an alternative embodiment, the mat can be held against the vessels hull using a propeller thruster. For smaller vessels, an aluminium rod can be utilised from the surface. Preferably the mat allows for some adhesion to the vessel whilst allowing simple lateral movement along the hull. The mat heats surface so as to kill the biological growth. Preferably it includes soft neoprene inner and outer flaps 20-21 around the perimeter to facilitate the efficient containment of the hot water. Materials other neoprene may also be suitable. The system of the preferred embodiment dispenses with the need to abrasive brushing or high pressure water blasting. This reduces the environmental effects of hull cleaning and also reduces the damage or wear to the vessels paint and outer hull.

The foregoing describes method and apparatus of the preferred embodiment. modifications, obvious to those skilled in the art, can be made thereto without departing from the scope of the invention.

We claim:

1. A method of cleaning marine growth on the hull of a water going object, the method including the step of:

(a) heating the marine growth on the surface of the hull.

2. A method as claimed in claim 1 wherein marine growth on said hull surface is heated whilst submersed below a water line.

3. A method as claimed in any previous claim wherein marine growth on said hull surface is heated by means of an adjacent blanket placed near the hull.

4. A method as claimed in claim 3 wherein heated water or steam is projected between the blanket and the hull surface so as to heat the marine growth on the hull surface.

5. A method as claimed in claim 3 wherein said blanket includes an outer rim for engaging with the surface of said hull, substantially holding said heated water or steam between the blanket and hull surface.

6. A method as claimed in any previous claim wherein the marine growth is heated to at least 50 Degrees Celsius.

7. A method as claimed in any previous claim wherein the marine growth is heated to at least 60 Degrees Celsius.

8. A method as claimed in any previous claim wherein the marine growth is heated for less than 5 seconds.

9. An apparatus for reducing the effect of biological build-up on a hull, the apparatus comprising:

heating means for heating marine growth on the surface of the hull.

10. An apparatus as claimed in claim 5 wherein said apparatus is designed to heat said hull surface whilst submersed in water.

11. A method of reducing the effect of biological build-up on a hull, the method substantially as herein described with reference to any one of the embodiments of the invention illustrated in the accompanying drawings and/or examples.

DATED this 9th Day of December 2003
BALDWIN SHELSTON WATERS
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ABSTRACT

A method of cleaning the hull of a water going object, the method including the step of: (a) heating the surface of the hull.

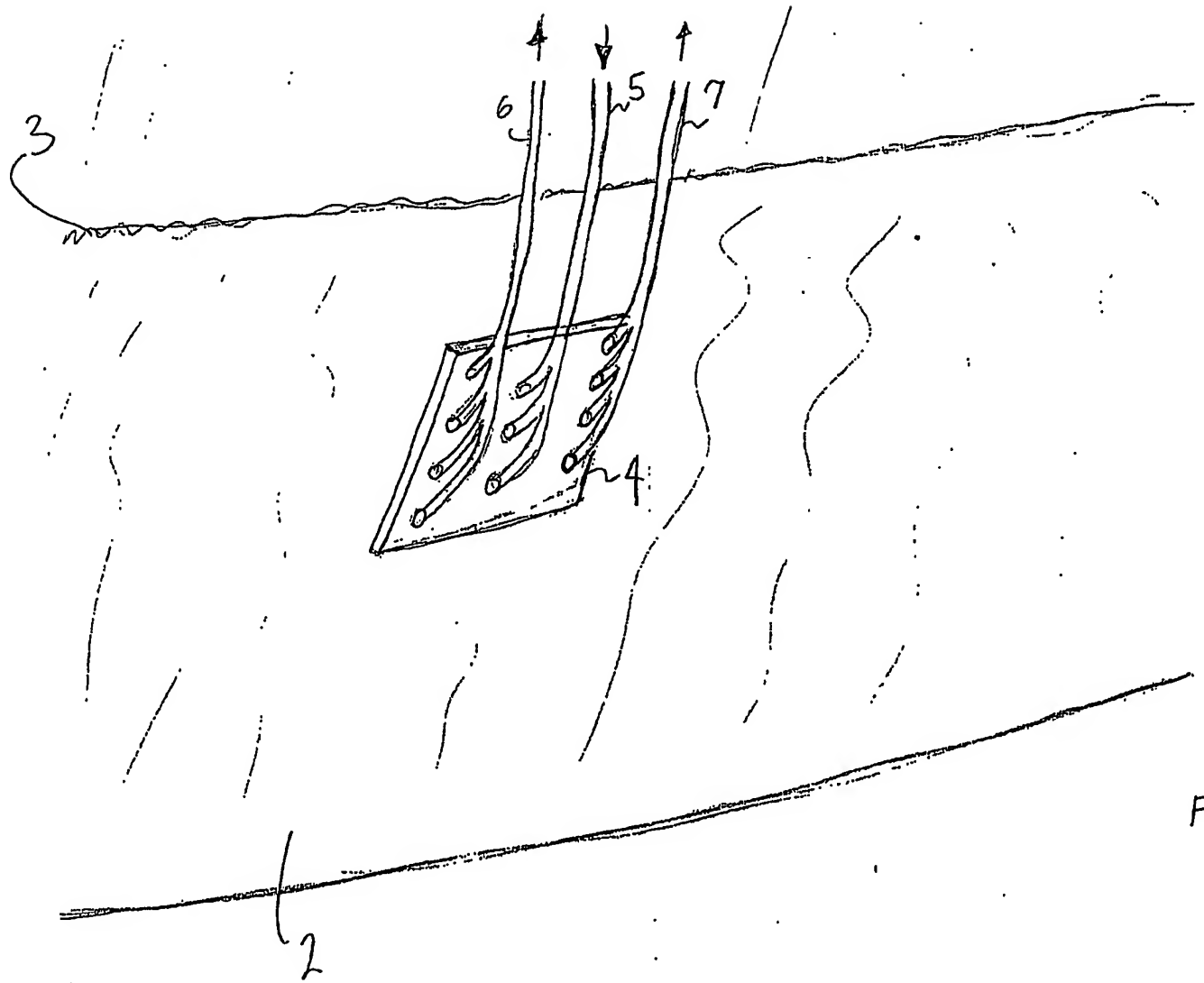

FIG. 1

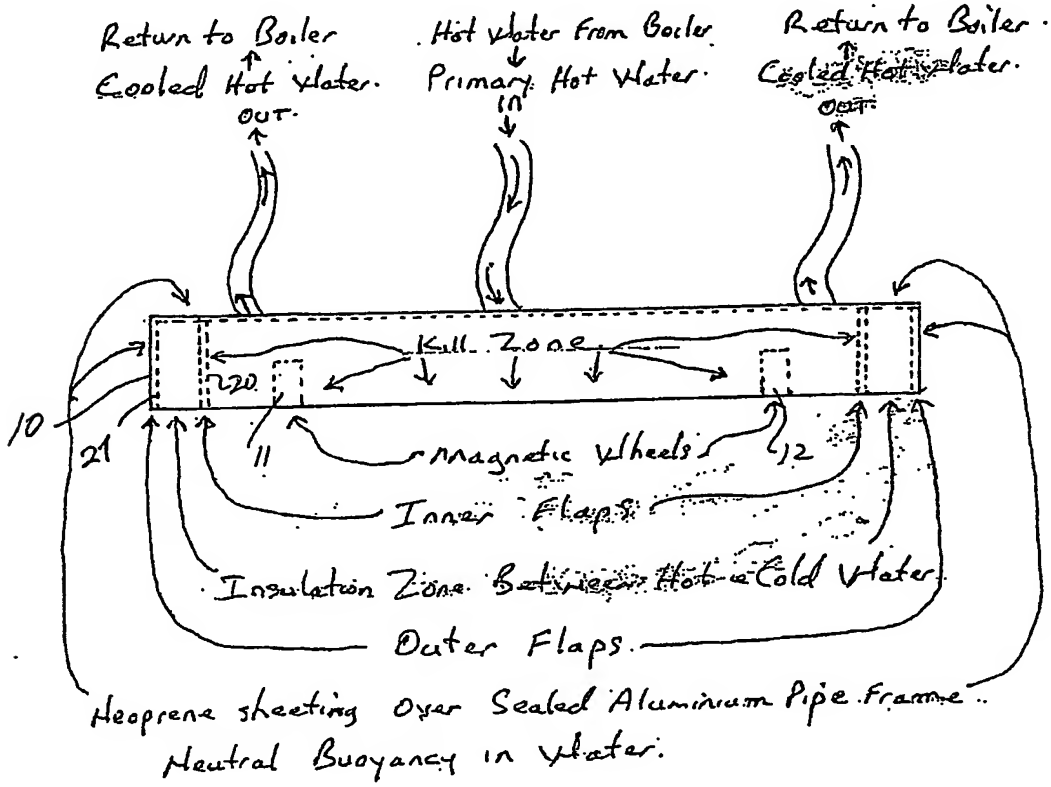
Return to Boiler
Cooled Hot Water.
OUT.
Hot Water From Boiler
Primary Hot Water.
IN
Return to Boiler.
Cooled Hot Water.
OUT.
Kill Zone
20
10
21
11
12
Magnetic Wheels
Inner Flaps
Insulation Zone Between Hot & Cold Water
Outer Flaps
Neoprene sheeting Over Sealed Aluminum Pipe Frame.
Neutral Buoyancy in Water.

Fig. 2

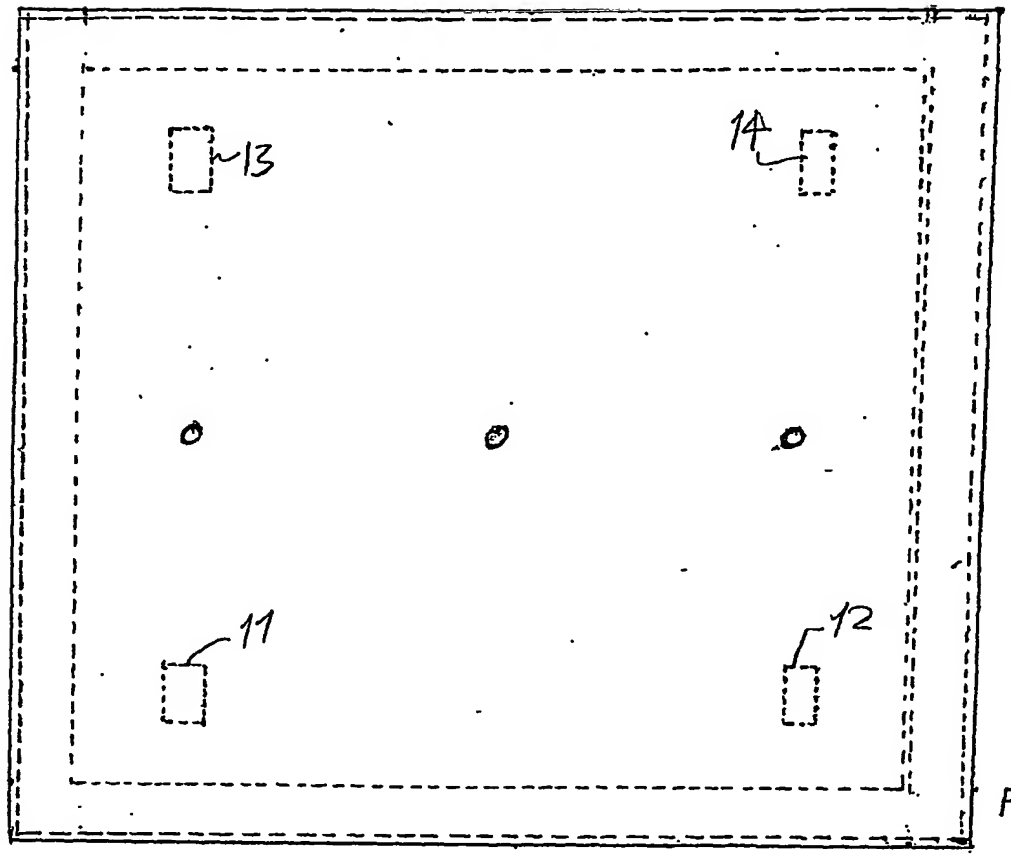

Fig. 3

Kill Mat Trolley.

Fig. 4

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